

From glowbugs@theporch.com Wed Nov 20 11:03:35 1996
Return-Path: <glowbugs@theporch.com>
Received: from uro (localhost.theporch.com [127.0.0.1])
by uro.theporch.com (8.8.3/AUX-3.1.1)
with SMTP id KAA25653;
Wed, 20 Nov 1996 10:55:40 -0600 (CST)
Date: Wed, 20 Nov 1996 10:55:40 -0600 (CST)
Posted-Date: Wed, 20 Nov 1996 10:55:40 -0600 (CST)
Received-Date: Wed, 20 Nov 1996 10:55:40 -0600 (CST)
Message-Id: <19961120165209700.AAB110@lee.radioadv.com>
Errors-To: conard@tntech.campus.mci.net
Reply-To: glowbugs@theporch.com
Originator: glowbugs@theporch.com
Sender: glowbugs@theporch.com
Precedence: bulk
From: glowbugs@theporch.com
To: Multiple recipients of list <glowbugs@theporch.com>
Subject: GLOWBUGS digest 358
X-Listprocessor-Version: 6.0c -- ListProcessor by Anastasios Kotsikonas
X-Comment: Please send list server requests to listproc@theporch.com
Content-Transfer-Encoding: 7bit
Content-Type: text/plain; charset=ISO-8859-1
MIME-Version: 1.0
X-Mailer: Microsoft Internet Mail 4.70.1155
Status: 0

GLOWBUGS Digest 358

Topics covered in this issue include:

- 1) Re: Ma Hartley (I call her ``Grandma Hartley'' cuz she was
by "Brian Carling" <bry@mail1.mnsinc.com>
- 2) Triode mu question.
by Conard Murray <conard@TNTECH.CAMPUS.MCI.NET>
- 3) Re: Visio schematics in Word files
by Conard Murray <conard@TNTECH.CAMPUS.MCI.NET>
- 4) Re: 6BM8 wiring and schematic
by "Brian Carling" <bry@mail1.mnsinc.com>
- 5) Re: Triode mu question.
by Dan Kerl <dlkerl@ro.com>
- 6) Re: Triode mu question.
by Conard Murray <conard@tntech.campus.mci.net>
- 7) Re: Triode mu question.
by "Jack Giehl" <jackg@one.net>
- 8) Paint Questions
by "Barry L. Ornitz" <u856010@eastman.com>
- 9) 811's or other triodes needed
by Conard Murray <conard@TNTECH.CAMPUS.MCI.NET>

- 10) Re: Ma Hartley (I call her ``Grandma Hartley'' cuz she was
by "Robert M. Bratcher Jr." <bratcher@worldnet.att.net>
- 11) Re: Triode mu question.
by mjsilva@ix.netcom.com (michael silva)
- 12) What is the 815 tube?
by "Robert M. Bratcher Jr." <bratcher@worldnet.att.net>
- 13) Re: 6L6 prototype -- the results
by "Brian Carling" <bry@mail1.mnsinc.com>
- 14) Re: What is the 815 tube?
by Roy Morgan <morgan@speckle.ncsl.nist.gov>
- 15) Re: Triode mu question.
by Roy Morgan <morgan@speckle.ncsl.nist.gov>
- 16) Re: Triode mu question.
by Roy Morgan <morgan@speckle.ncsl.nist.gov>
- 17) Re: Triode mu question.
by rdkeys@csemail.cropsci.ncsu.edu
- 18) Re: Triode mu question.
by jlevro@shore.net (John Levreault)
- 19) Re: Ma Hartley (I call her ``Grandma Hartley'' cuz she was
by jeffd@coriolis.com (Jeff Duntemann)
- 20) Re: 6BM8 wiring and schematic
by lee@radioadv.com (Lee Richey)

Date: Tue, 19 Nov 1996 14:05:09 +0000
From: "Brian Carling" <bry@mail1.mnsinc.com>
To: rdkeys@csemail.cropsci.ncsu.edu
Subject: Re: Ma Hartley (I call her ``Grandma Hartley'' cuz she was
Message-ID: <199611192202.RAA25179@user2.mnsinc.com>

Thanks for the comments Bob.

Interesting - the first item I EVER built was a 5 watt Hartley on 27 MHz - I think it used a 6J6 or some such tube that had TWO plate caps on the top... What WAS that crazy tube? I got the design from some magazine article about radio control over in England. It ran fine. I knew it worked because it jammed all of the TVs in the neighborhood! The coil was wound on a wooden cotton reel and center tapped best I remember. It used "Double-Cotton-Covered copper wire" - I thought it was pretty important to use the right kind of wire back then, he he! The tuning cap was a 50 pF variable that I biught specially for the project, and it had brass plates.

*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the great ham radio resources at: *
** <http://www.mnsinc.com/bry/> *

Date: Tue, 19 Nov 1996 16:09:51 -0600
From: Conard Murray <conard@TNTECH.CAMPUS.MCI.NET>
To: glowbugs@theporch.com
Subject: Triode mu question.
Message-ID: <3292302F.68ED@tntech.campus.mci.net>

Hello All,

I am somewhat perplexed. I have been studying the books lately to get some feeling of what was going on inside these circuits and to possibly try some designs with the Svetlana SV811-XX series tubes.

These SV-811 bottles are low mu triodes (mu of 3 and 10) and are not to be confused with the high mu 811A (160ish). I have studied the graphs and determined the values for the tube parameters, but I still can't find the answer to this one question ... What difference does it make if a triode has a high mu or a low mu?

I was hoping Terman might shed some light on this, but he said that triodes range from a low of 2 to a high in the hundreds and that different designs used different values of mu, but no mention anywhere as to what designs used what.

I am assuming that RF amplifiers use a high mu because most if not all the specified tubes for RF design have a high mu.

What would be gained by having a low mu?

If I want to do something crazy (I am known for this) like use a low mu triode for a RF design am I getting into trouble? I am thinking that with a low mu tube that it would take more of a swing in grid voltage to get the same swing in plate voltage. Would this translate directly into a need for more driving power or could this be taken into consideration with the design of the input network? Or both?

Thanks....

Conard, ws4s

--

Conard Murray	WS4S	NNNOUTN	Glowbugs Listowner
217 Dyer Avenue			BA/GB net 1803.5/3579.5/7050 KHz
Cookeville, Tn	38501		conard@tntech.campus.mci.net
615-526-4093			Wise men still seek Him

Date: Tue, 19 Nov 1996 15:51:18 -0600
From: Conard Murray <conard@TNTECH.CAMPUS.MCI.NET>
To: jeffd@coriolis.com

Subject: Re: Visio schematics in Word files
Message-ID: <32922BD5.1DCF@tntech.campus.mci.net>

Hi Jeff,

I downloaded the file and printed it through Word 7.0 on the HP Deskjet 560 C and it is sharp as a tack. Absolutely fantastic! Whatever you did, it is working.

Thanks for sharing your design.

73 de Conard

--

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Cookeville, Tn	38501		conard@tntech.campus.mci.net
615-526-4093			Wise men still seek Him

Date: Tue, 19 Nov 1996 14:22:08 +0000
From: "Brian Carling" <bry@mail1.mnsinc.com>
To: jeffd@coriolis.com (Jeff Duntemann)
Subject: Re: 6BM8 wiring and schematic
Message-ID: <199611192219.RAA27026@user2.mnsinc.com>

HEY! It's a reply from AF4K!

I have WORD here but no IDEA how to create a schematic on it at all. I know they are huge but I think a GIF file might be the best compromise for now.

I have a page scanner here, and am putting together some schematics to e-mail to everyone soon. I hope that they will be pleased with how the articles turn out.

On 19 Nov 96, Jeff Duntemann wrote:

> At 01:28 PM 11/19/96 -0600, WA3FIY wrote:
>
> >Is there anyone in this group with experience publishing
> >drawings, etc. on the net? If so, what do you find to be
> >the best tools?
>
> The one big gap in Web data formats is lack of a standard vector
> format for technical line drawings. It's absurd to use something as
> big as a GIF or TIF to specify a few hundred vectors.
>
> I use Visio Technical 4 to draw schematics and PC board layouts. It

> produces by far and away the best printed output of any drawing
> program I've ever used, and has a professional polish that makes the
> traditional CAD programs' output look like kid stuff. If you'd like
> to see some Visio output, I'll be happy to send you a couple of my
> schematics and PC layouts. Just send me a land address.

>

> Don't use JPEGs to encode line drawings, by the way. JPEG is a
> lossy format, and you can get some weird discontinuities in your
> lines. JPEG was really meant for photos and continuous-shade
> low-resolution images.

>

> I'm playing around with embedding Visio drawings in Microsoft Word
> document files. This is a trick to enable you to view a Visio
> drawing without having to have Visio. The great blind spot with the
> Visio people (and I've excoriated them about this numerous times
> from my position as a computer magazine editor) is that they haven't
> released a "dumb viewer" for their file format. It's tough to
> distribute Visio drawings electronically because you need Visio
> itself to view and print them.

>

> (One piece of my advice that they DID take is to add a few common
> tube symbols to their schematic symbol set--of course, after I had
> gone to the trouble of creating my own!)

>

> More on this as I learn it. If I can get my 6AG7/6L6 schematic into
> a Word document, I'll put it on my Web site and you guys can
> download it from there. Word is certainly more common than Visio!

>

> --73--

>

> --Jeff Duntemann KG7JF
> Scottsdale, Arizona

>

>

>

*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the great ham radio resources at: *
** <http://www.mnsinc.com/bry/> *

Date: Tue, 19 Nov 1996 17:01:59 -0600
From: Dan Kerl <dlkerl@ro.com>
To: glowbugs@theporch.com
Subject: Re: Triode mu question.

Message-ID: <32923C67.1E07@ro.com>

Conard Murray wrote:

>
> Hello All,
> I am somewhat perplexed. I have been studying the books lately to get
> some feeling of what was going on inside these circuits and to possibly
> try some designs with the Svetlana SV811-XX series tubes.
> These SV-811 bottles are low mu triodes (mu of 3 and 10) and are not to
> be confused with the high mu 811A (160ish). I have studied the graphs
> and determined the values for the tube parameters, but I still can't
> find the answer to this one question ... What difference does it make if
> a triode has a high mu or a low mu?

(just a guess...)

Consider the equation:

$$\mu = G_m * r_p$$

This means that for a given operating point, an increase in mu can only be brought about by either an increase in transconductance or an increase in plate resistance. Generally, if a family of tubes share a similar mechanical design, mu is gained at the expense of higher plate resistance, which makes application design more difficult (higher voltages necessary to achieve desired power levels, etc.)

Comments?

Dan Kerl
dlkerl@ro.com

Date: Tue, 19 Nov 1996 18:49:24 -0600
From: Conard Murray <conard@tnitech.campus.mci.net>
To: dlkerl@ro.com
Subject: Re: Triode mu question.
Message-ID: <32925594.BD2@tnitech.campus.mci.net>

Dan Kerl wrote:

>

>
> Consider the equation:
>
> $\mu = G_m * r_p$
>

> This means that for a given operating point, an increase in μ can
> only be brought about by either an increase in transconductance or
> an increase in plate resistance. Generally, if a family of tubes
> share a similar mechanical design, μ is gained at the expense of
> higher plate resistance, which makes application design more
> difficult (higher voltages necessary to achieve desired power
> levels, etc.)

>

> Comments?

>

Hi Dan,

Thanks for the reply.

So why would you want to gain μ at anything else's expense? Tubes are marketed as high/medium/lo μ so that must mean something.

I can see wanting a low plate resistance since that allows 'more power per volt' so to say. I found out about low plate resistance when I subbed a 6Y6 ($R_p \sim 10K$) in place of a 6L6 ($R_p \sim 22K$) in my homebrew transmitter. With 500 volts on the plate (just 200% overload on the 6Y6!) I was getting 50 watts of output versus 35 watts with the 6L6. A 6V6 ($R_p \sim 55K$) would give only 25 watts or so.

I imagine that interelectrode capacitances would place some limit on the possible values of μ . Moving the grid closer to the cathode would seem to increase the μ as well as increasing the capacitance between the grid and the cathode. OTOH, a higher μ also implies a lower plate to cathode capacitance so that might be one reason why high- μ tubes are favored in RF circuits.

73 de Conard, ws4s

>

--

Conard Murray WS4S NNNOUTN	Glowbugs Listowner
217 Dyer Avenue	BA/GB net 1803.5/3579.5/7050 KHz
Cookeville, Tn 38501	conard@tntech.campus.mci.net
615-526-4093	Wise men still seek Him

Date: Tue, 19 Nov 1996 20:34:53 +0000
From: "Jack Giehl" <jackg@one.net>
To: glowbugs@theporch.com
Subject: Re: Triode μ question.
Message-ID: <199611200134.UAA20871@one.net>

Dear Glowbugs,

Conard was asking about applications for low and high mu tubes.

According to the Eimac's Care and feeding of Power Grid Tubes book, low mu (less than 20) triodes are used mostly for audio service or any application which requires a large change in plate current without driving the tube into the positive grid region.

Medium mu (20 to 50) triodes are used mostly for RF amps and oscillators, but also for audio amps and modulators.

Eimac's high mu (~200) triodes are mostly zero bias designs used for grounded grid RF and audio amps. The designs for these are simpler because of the power gain of the tubes, and no protection for grid drive loss or bias voltage failure.

The tube you want to use is determined by the amplification you need from the stage.

If you tried to use a 3CX3000A1 in grounded grid for RF, you would probably need a KW of drive to get 4KW out! A 3CX3000A7 (hi mu) would give the same output for about 150 watts of drive.

Jack

=====
Jack, WB8BFS
jackg@one.net Loveland, Ohio (near Cincinnati)
=====

Date: Tue, 19 Nov 1996 20:34:02 -0500 (EST)
From: "Barry L. Ornitz" <u856010@eastman.com>
To: Boatanchors Mailing List <boatanchors@theporch.com>,
Cc: Chip Owens <owens@stout.atd.ucar.edu>
Subject: Paint Questions
Message-ID: <Pine.ULT.3.91.961119195948.8703B-1000000@dua150.kpt.emn.com>

On Tue, 19 Nov 1996, Chip Owens, NW00, asked me the following questions in private email. With his permission I am posting it on Boatanchors (and by Chip's request also on Glowbugs). It seems we are constantly getting newcomers with similar questions so for those of you who have read this same basic information in various incarnations before, hit delete now. By the way, I added a little more to my original reply to Chip.

> Please forgive me if this is a well-beaten to death
> subject for you. I'm trying to find out how to get a good durable
> black wrinkle paint finish that won't scratch or flake off the
> first time it is knocked into.

OH NO! Someone else searching for the **Holy Grail!** : -)

> On other types of paint-especially Krylon spray paint,
> I have been careful to clean the aluminum surface of all oils, dirt,
> etc. I use the Krylon primer followed by a couple coats of Krylon
> spray paint. I follow their directions as to temperature and humidity
> and re-coat intervals etc. I find the finish not to be very durable
> at all for home made electronic equipment. I marvel at the nice black
> wrinkle finish on the military gear that still is intact after 50 years.
> I'd like to be able to approach this level of quality finish for my
> home made projects.

Most Krylon is a lacquer and not really an enamel paint. A lacquer is basically just a plastic or solid resin dissolved in a solvent. When the solvent evaporates, the resulting finish left behind is basically a thin coating of the plastic or resin. As you note, it is not very durable. Part of this is the fact that as the solvent evaporates, the surface is left under stress. Likewise, bonding to the original surface tends to be more mechanical than chemical. A somewhat rougher surface tends to hold the lacquer better.

Enamel paint, however, relies on a chemical reaction to "dry". In fact, it does not really dry, per se. First it loses its solvents by evaporation. These are there to control the viscosity of the paint (how "thick" it is), and to allow the paint to level and leave a smooth surface. At this point, the paint begins to harden by a rather complex chemical process. The traditional oil paints of days gone by harden by an oxidation process. Oxygen in the air reacts with unsaturated bonds in the oils resulting in cross-linking and polymerization of the oils. The end result is a high molecular weight, highly cross-linked polymer. If you ever wondered why thick drips of oil paint never hardened completely inside, consider that as the surface polymerizes, the oxygen in the air can no longer diffuse through the "skin" and harden the paint inside.

Many newer paints, like the two-part epoxies and urethanes, have a resin and hardener that is mixed just prior to use. These paints can polymerize without oxygen and they generally do so in a matter of hours. Thus you mix them and use them quickly, followed by cleaning out your painting equipment. If you delay, everything hardens and you can never clean it up! The newer urethane automotive paints tend to have some "heavy duty" safety requirements on chemical exposure and require proper respirators for use. I suggest you avoid them completely unless you have professional training as a spray painter and have ALL the necessary safety equipment. Single-part epoxies found in spray cans still rely on air exposure to start the curing process. They tend to be very durable but can take a while to cure properly.

As you can imagine, this polymerization and cross-linking in place (in situ) can make a fairly tough surface after everything has thoroughly reacted. This can mean several days of air drying or possibly a heated oven. The polymerization also tends to provide a fairly good bond to the surface being painted.

To achieve solubility, the polymer used in a lacquer paint can never have as high a molecular weight or be as highly cross-linked as can a reactive paint. Thus lacquers tend to have minimal solvent resistance and tend to soften at elevated temperatures. The result is less durability than oil-based paints.

There are some new water-based latex paints now available in spray cans today. These still contain some organic solvents but their main purpose is to decrease solvent emissions. These do cross-link after exposure to air but I have not had very good luck in getting a good glossy finish with them. I would rank their durability less than oil-based enamels too.

> I'd like to focus on the black-wrinkle finish for now since that is my
> favorite. I have a new can of black wrinkle paint that only mentions
> having the surface clean and dry before painting. It does not say
> anything about using a primer or if the paint is suitable for bare
> metal-in my case, aluminum. I don't want to end up with another less
> than satisfactory finish on my next project. I thought this would be a
> good time to explore the paint surface preparation question.

There are others on the list who can give you far better pointers on painting than I can. However, I should mention that it is probably impossible to duplicate today the wrinkle finishes of the late 1930's and 1940's. This is mainly due to the fact that the materials used in these paints are no longer commercially available. Also "drying" was often done in gas-fired ovens and the presence of carbon monoxide in the ovens had an effect on the finish too (sometimes called gas checking). Finally there were really about 20 or 30 finishes that we call "wrinkle" today. Some of the proper names included Crystal, Alligator, Crackle, Windowfrost, etc. Early wrinkle paints were based on Tung oil (which is still available) but the other materials reacted with it (phenolics and such) are frowned on today.

Black wrinkle paint is about all that is available today and it is based on some polyvinyl chloride chemistry that is much newer than the original Tung oil chemistry used earlier. I have little experience with it. However, I can make some general recommendations. Wrinkling occurs when the surface of the paint expands on polymerization (most oils shrink). Thus a fairly thick coating of paint should be used. Spraying on a previously warmed surface has also been suggested. I cannot say much about undercoats but it is logical that they should be fully cured before adding the wrinkling layer on top. On aluminum, I generally use a

slightly roughened surface to enhance the paint adherence. Special primers are available to provide some etching of the aluminum surface which will enhance adherence too. After several days of curing of the primer, I generally apply the top layer(s). Wrinkling paint is probably best applied in one thick layer while other paints should be applied in several thin layers.

Different methods are generally used to prepare aluminum for painting. The satin finish obtained by caustic etching is one route. Go back a month or two in the archives to read about this. This leaves a dull satin finish to the aluminum that is somewhat porous. Just be sure to let the aluminum dry for several days before painting. The lye solution is corrosive and explosive hydrogen gas is released by the process so be sure and read the previous warnings before trying this.

Commercial practice usually calls for the aluminum to be "alodized" with a commercial chromate conversion coating. "Iridite", "Alodyne" and "Alumiprep" are some trade names for the process. In this process, the surface of the aluminum is slightly dissolved and coated with an extremely thin hexavalent chromium layer. The process is extensively used in aircraft finishing so you might check with someone who does aviation painting. However, hexavalent chromium compounds are EXTREMELY TOXIC. Their release to the environment is a hazard too. Again I would avoid this unless you have the proper facilities and experience.

Finally, let me add that all paints can be hazardous. The solvents in spray paints are virtually all quite flammable. They also can cause lung and especially liver damage if you breath them. If you must do spray painting, I suggest you do it outdoors, well away from any source of spark or flame. Keep a fire extinguisher handy too (dry chemical type). Do not place a painted panel in your wife's oven either unless: 1) is is already rather dry, and 2) you have a VERY understanding wife.

73, Barry L. Ornitz WA4VZQ ornitz@eastman.com

Date: Tue, 19 Nov 1996 19:45:10 -0600
From: Conard Murray <conard@TNTECH.CAMPUS.MCI.NET>
To: glowbugs@theporch.com
Subject: 811's or other triodes needed
Message-ID: <329262A6.6E63@tntech.campus.mci.net>

Hello fellow filament freaks,
I need to find a few 811's/812's or other triode output tubes for a glowbug project. Anyone have anything for sale/trade?
Thanks, de Conard, WS4S

--

Conard Murray WS4S NNNOUTN Glowbugs Listowner
217 Dyer Avenue BA/GB net 1803.5/3579.5/7050 KHz
Cookeville, Tn 38501 conard@tntech.campus.mci.net
615-526-4093 Wise men still seek Him

Date: Tue, 19 Nov 1996 20:21:16 -0600
From: "Robert M. Bratcher Jr." <bratcher@worldnet.att.net>
To: glowbugs@theporch.com
Subject: Re: Ma Hartley (I call her ``Grandma Hartley'' cuz she was
Message-ID: <1.5.4.32.19961120022116.006d9204@postoffice.worldnet.att.net>

At 10:03 PM 11/19/96 +0000, you wrote:

>Thanks for the comments Bob.
>Interesting - the first item I EVER built was a 5 watt Hartley on 27
>MHz - I think it used a 6J6 or some such tube that had TWO plate caps
>on the top... What WAS that crazy tube? I got the design from some
>magazine article about radio control over in England. It ran fine. I
>knew it worked because it jammed all of the TVs in the neighborhood!
>The coil was wound on a wooden cotton reel and center tapped best I
>remember. It used "Double-Cotton-Covered copper wire" - I thought it
>was pretty important to use the right kind of wire back then, he he!
>The tuning cap was a 50 pF variable that I biught specially for the
>project, and it had brass plates.

The only dual plate cap tube I know of is the 815.
Got one in my tube stock. Need to look up the specs in an ARRL handbook.
Might build a transmitter with it!

Robert M. Bratcher Jr.
E-mail to:
bratcher@worldnet.att.net
Record collector, 8mm, super 8, 16 and 35mm Film collector.
I like old radio's too.
Collins, Hallicrafters, National & Hammurand are my Favorites!

Date: Tue, 19 Nov 1996 22:16:20 -0800
From: mjsilva@ix.netcom.com (michael silva)
To: glowbugs@theporch.com
Subject: Re: Triode mu question.
Message-ID: <199611200616.WAA18135@dfw-ix6.ix.netcom.com>

>(just a guess...)
>
>Consider the equation:
>
> $\mu = G_m * r_p$
>
>This means that for a given operating point, an increase in μ can
>only be brought about by either an increase in transconductance or
>an increase in plate resistance. Generally, if a family of tubes
>share a similar mechanical design, μ is gained at the expense of
>higher plate resistance...

I would have thought that tubes of a similar mechanical design would have similar plate resistances (the field exerted by the plate in the plate-cathode region would be the same), and that a higher- μ tube would be achieved by moving the grid closer to the cathode (hence higher G_m).

73,
Mike, KK6GM

Date: Wed, 20 Nov 1996 00:18:13 -0600
From: "Robert M. Bratcher Jr." <bratcher@worldnet.att.net>
To: glowbugs@theporch.com
Subject: What is the 815 tube?
Message-ID: <1.5.4.32.19961120061813.006dc9d4@postoffice.worldnet.att.net>

I'd like to know what kind of tube this is and the specs please?
First twin plate cap tube I've seen.

Robert M. Bratcher Jr.
E-mail to:
bratcher@worldnet.att.net
Record collector, 8mm, super 8, 16 and 35mm Film collector.
I like old radio's too.
Collins, Hallicrafters, National & Hammurland are my Favorites!

Date: Wed, 20 Nov 1996 04:42:13 +0000
From: "Brian Carling" <bry@mail1.mnsinc.com>
To: jeffd@coriolis.com (Jeff Duntemann), glowbugs@theporch.com
Subject: Re: 6L6 prototype -- the results
Message-ID: <199611201239.HAA08274@user2.mnsinc.com>

HEY! It's a reply from AF4K!

Oh my gosh! Beautiful quality!

Now if only that program were shareware ! !

I printed it out on a Laser Jet printer and it looks like a page out of a magazine. Excellent!

On 18 Nov 96, Jeff Duntemann wrote:

> Hi gang--

>

> This weekend I finally finished the prototype 6AG7/6L6 rig I've
> spoken of here in recent weeks. It generated power right off the
> bat--with the downside that the pi net will not tune or load
> properly on 40m. As an 80m rig it's killer, but the intent was to
> create a pi net that would work on both 80 and 40 without taps or
> switching. I'm pretty sure at this point that the tank coil is too
> big, and the next step is to knock a few turns off of it and try it
> again.

>

> But I stuck to 80m and did something interesting: I rummaged through
> my tube collection and drug out every 7S power tube I could find
> (and hey, anybody know what the difference between a 7AC and 7S base
> is? I see no difference in the '65 Handbook illos...) and tried
> them all in the rig. They all worked...and there were some
> surprises.

>

> The rig was powered by a junkbox homebrew ps I got at a hamfest in a
> \$50-takes-it-all kind of deal. It's got a key-down voltage of 350
> or so, but the regulation is terrible (key up is about 475) so I
> didn't put the rig on the air for fear of chirping, tempted tho I
> was. I will try other and better power supplies I have on hand once
> I can get some Jones plug cables together for them.

>

> So here are the results. P0 was measured on a B&W 374 dummy
> load/wattmeter. Test frequency 3720:

>

> Tube Plate ma Power out

> =====

> 6L6GC	63	13W
> 5881	60	12W
> 6K6G	35	8W
> 6550	63	14W
> 6F6G	30	8W
> 6V6G	50	10.5W
> 6W6GT	55	11.5W

>
> Note that these power measurements are OUTPUT, not input. I didn't
> measure the screen current so I didn't bother calculating
> efficiency, but from my experience these numbers seem pretty decent.
> I was astonished at the showing put in by a ratty Motorola 6W6GT,
> pulled out of lord-knows-what when I was a teenager in the Sixties,
> still filthy and smelling vaguely of dog urine (my old dog Hank peed
> on a box of junk I had in the garage in 1967, and that tube must
> have been in it!) but pumping power at 20+ watts input!
>
> The 6550, by the way, is a BEAUTIFUL tube. I didn't even know what
> it was and had never had it out of the box (another of those
> buy-the-whole-box-and-who-cares-what's-in-it deals) but it's
> gorgeous, a G-bottle on steroids, muscular and stubby and really
> cool. When I build this rig for real that 6550 will be in the
> driver's seat. It wants more juice, which I have on the shelf and
> will report on once I rig it next weekend.
>
> So...the circuit works, with the caution that it won't load on 40m
> yet. I'll work on that and post new specs here for the coil when I
> get it licked.
>
> --73--
>
> --Jeff Duntemann KG7JF
> Scottsdale, Arizona
>
>
>
>

*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the great ham radio resources at: *
** <http://www.mnsinc.com/bry/> *

Date: Wed, 20 Nov 1996 08:14:11 -0500
From: Roy Morgan <morgan@speckle.ncsl.nist.gov>
To: bratcher@worldnet.att.net, glowbugs@theporch.com
Subject: Re: What is the 815 tube?
Message-ID: <9611201314.AA01401@speckle.ncsl.nist.gov>

At 12:20 AM 11/20/96 -0600, Robert M. Bratcher Jr wrote:

>I'd like to know what kind of tube this is and the specs please?

>First twin plate cap tube I've seen.

815 tube:

Pin	Use
1	heater
2	grid unit 1
3	cathode and shield
4	grid 2 (common to both units!)
5	heater center tap
6	cathode
7	grid unit 2
8	heater

Note: cathode is common and the screen grid (2) is common.

fil: 12.6 v 0.8 amp (or 6.3v. 1.6 amp)

(Values for BOTH sections in push-pull operation)
Maximum typical operation(class C osc.)

plate diss 25 w

Eb	500v	500
Es	200v	200
Pscreen	4w	

grid voltage	-45
Ib	150 ma
Is	17 ma
Ig	2.5 ma
grid drive power	0.13 w
Carrier power output	56 w

-- Roy Morgan/Building 820, Room 562/Gaithersburg MD 20899
(National Institute of Standards and Technology, formerly NBS)
301-975-3254 Fax: 301-948-6213 morgan@speckle.ncsl.nist.gov --

Date: Wed, 20 Nov 1996 09:18:29 -0500
From: Roy Morgan <morgan@speckle.ncsl.nist.gov>
To: glowbugs@theporch.com

Subject: Re: Triode mu question.

Message-ID: <9611201418.AA01911@speckle.ncsl.nist.gov>

At 07:35 PM 11/19/96 -0600, you wrote:

>Conard was asking about applications for low and high mu tubes.

>

>According to the Eimac's Care and feeding of Power Grid Tubes book,

>low mu (less than 20) triodes are used mostly for audio service

About the Svetlana SV811-3 and SV811-10 tubes:

One MAJOR tradeoff in these is the LINEARITY of the tube in class A audio service. The SV811-3 is possibly the most linear tube in class A service available today. (One exception seems to be the Svetlana SV572, available in versions having three values of mu) The audio folks who build class A single ended amplifiers cherish this quality, found in the Type 45, the 2A3 and 6B4, and in the famous Western Electric 300B. Lower mu tubes often have better linearity.

In audio applications, design and construction of the output transformer is a major challenge. It appears that in order to build the very best HIFI transformer for the 211/VT-4C tube in single ended service, it is necessary to use ALL of the known mechanical techniques, the very best of materials, and hand construction. The resulting transformers cost from \$600 to \$4000 each. The primary inductance required to support good performance and the demand for low leakage inductance to allow good high frequency performance, combined with the need for massive core to support unbalanced standing magnetization without non-linearity all combine to make the design challenges almost unsurmountable. Lower plate resistance in the tube(s) reduces these demands but increase the demands on driver stage design.

The needed bandwidth in high end hifi applications is 15 or 20 cps to 40,000 cps.

In communications AM modulator service the bandwidth is from 150 cps to 3000 cps, and in broadcast service, perhaps from 100 cps to 8000cps.

To conclude, here are some numbers for your consideration:

Toobe	MU	current cost
-------	----	--------------

SV811-3	3	\$30*
---------	---	-------

SV811-10	10	\$30*
----------	----	-------

SV572	10-150?	\$80?*
-------	---------	--------

2A3	4.2	\$50 to \$75
-----	-----	--------------

811A 160 \$15 to \$50
8005 20 \$100 to \$250
211/VT-4C 12 \$100 to \$200

* surf to: <http://www.svetlana.com/>

-- Roy Morgan/Building 820, Room 562/Gaithersburg MD 20899
(National Institute of Standards and Technology, formerly NBS)
301-975-3254 Fax: 301-948-6213 morgan@speckle.ncsl.nist.gov --

Date: Wed, 20 Nov 1996 09:37:16 -0500
From: Roy Morgan <morgan@speckle.ncsl.nist.gov>
To: Multiple recipients of list <glowbugs@theporch.com>
Subject: Re: Triode mu question.
Message-ID: <9611201437.AA02140@speckle.ncsl.nist.gov>

I forgot to include the most famous 300b:

Toobe MU current cost
WE 300B ? \$150 to \$450

-- Roy Morgan/Building 820, Room 562/Gaithersburg MD 20899
(National Institute of Standards and Technology, formerly NBS)
301-975-3254 Fax: 301-948-6213 morgan@speckle.ncsl.nist.gov --

Date: Wed, 20 Nov 1996 11:45:20 -0500 (EST)
From: rdkeys@csemail.cropsci.ncsu.edu
To: conard@tnitech.campus.mci.net
Cc: rdkeys@csemail.cropsci.ncsu.edu (), glowbugs@theporch.com
Subject: Re: Triode mu question.
Message-ID: <9611201645.AA102262@csemail.cropsci.ncsu.edu>

> If I want to do something crazy (I am known for this) like use a low
> mu triode for a RF design am I getting into trouble? I am thinking that
> with a low mu tube that it would take more of a swing in grid voltage to
> get the same swing in plate voltage. Would this translate directly into
> a need for more driving power or could this be taken into consideration
> with the design of the input network? Or both?

> Thanks....
> Conard, ws4s

Conard.... You are not crazy. You are only flying high into the face of traditional engineering (but I won't tell the engineers if you don't).

There is a very common myth out there that lo-mu audio tubes won't work at RF, in stoopid little ditties like self controlled oscillators (read yer fine and glowin' Hartley, Colpitts, TNT, TPTG, Meissner, Armstrong, or other oscillatory design --- there are a few others). This is basically a bogus hack by tube designers who wanted to have the exact tube for the exact job. Well, we all know that hams are a persnickety lot, and prone to turn the apple cart upside down, and see if them thar apples really do fall down or UP..... In this case, they fall both ways. In oscillator circuits where feedback is used to generate the oscillations (mostly all of them), the feedback fills in the gap for lo-mu. Thus you can take anything from a hi-mu tube like a 6SL7, to a medium-mu tube like a 6SN7, to a very lo-mu tube like a 6336 (this is the classic vacuum tube pass transistor regulator), and all will work just fine in oscillators. For example, I can take the Grammer Hartley circuit in the BA/GB archives, drop in a 6SN7 instead of the '45, or use a 6SL7, or a 6080, or a 6336, with equal impunity. They all will work, but some work better than others, and some require exhorbitant filament current, etc. Thus, ANY of the Svetlana triodes should work just fine in Hartley circuits. Some may work a little better, or be easier to adjust for feedback taps, etc., and in this case I would tend to favor the lower mu tubes rather than the higher mu tubes. I have had some trouble getting the 811A's to oscillate reliably in Hartleys, but '45's will take off readily. At least, in oscillators, it really does not matter much, but you will probably get somewhat better results with lower mu tubes. In amplifiers, the reverse is usually true in RF service. Thus if you were building an outboard amplifier for the Hartley, you might want to use the Svetlana 811-10 tube or the normal 811 over the 811-3. But, all WILL work, if you feed them properly.

For fun, I challenge all ye glowbuggites to fires ye up a 6336 set. That is like 100 12AU7's in one bottle....(:+}}..... Beware that its heater current is over 5 amperes. Also, it tends to like lower plate voltages like 150 or so. It also will regenerate, too....(:+}}.....

73/ZUT DE NA4G/Bob UP

p.s. Hint..... Plays ye wid wats ye gots fer firebottles....they all will usually work just fine.....I won't tell the engineers if ye won't!

Date: Wed, 20 Nov 1996 10:26:15 -0500 (EST)
From: jlevro@shore.net (John Levreault)
To: morgan@speckle.ncsl.nist.gov
Cc: glowbugs@theporch.com
Subject: Re: Triode mu question.
Message-ID: <199611201526.KAA00721@relay1.shore.net>

Roy said:

>I forgot to include the most famous 300b:
>
>
>Toobe MU current cost
>
>WE 300B ? \$150 to \$450
>

If you can find me any NOS WE300B's for \$150, I'll take 100!

The going price is closer to \$350-450 (each)). Prices for non-WE types start at about \$60 (cheapie Chinese), and go up to about \$200 for the premium Chinese. Believe me, you get what you pay for. The Russians are now sampling some, and they'll allegedly sell for around \$70. The well-publicized reintroduction of the WE300B was apparently a scam.

Ah, but what a sound from a 7-watt amp!

Oh, yes, the mu is 3.85.

73 de NB1I
John Levreault

Date: Wed, 20 Nov 1996 08:37:06 -0700
From: jeffd@coriolis.com (Jeff Duntemann)
To: bry@mnsinc.com
Cc: glowbugs@theporch.com
Subject: Re: Ma Hartley (I call her ``Grandma Hartley'' cuz she was
Message-ID: <1.5.4.32.19961120083240.00f34048@ntserver.coriolis.com>

At 03:55 AM 11/20/96 +0000, you wrote:
>HEY! It's a reply from AF4K!

>On 19 Nov 96, Jeff Duntemann wrote:

>

>> At 04:03 PM 11/19/96 -0600, you wrote:

>> My guess is the 815, which is an octal-based twin power tetrode (I
>> think) used widely on low VHF in the Fifties. Was it twin 837's in
>> one envelope or something like that? That tickles a neuron but I
>> don't know where I read it.

>>

>> The other possibility is the venerable 829B, which doesn't have
>> plate caps but plate "rods" perhaps 1/16" in diameter. But it's a
>> very distinctive design and I suspect you'd remember it; nothing
>> else ever looked quite like it in tube history.

>>

>> There was also a family of proprietary twin tubes (with separate
>> plate caps) from Hytron, but I know very little about them.

>>

>> --73--

>>

>> --Jeff Duntemann KG7JF

>> Scottsdale, Arizona

>

>No Jeff - it was none of the above. Something very much smaller than
>all of those. It was octal base, and about the same size as a 6V6
>best I remember. I think it was just a triode, but I may be
>forgetting!

The two or three twin-cap Hytron tubes I've seen over the years were GT
bottles, about the size of a 6V6. They had numbers like HY-37, but I have
no other information on them. If anyone else knows anything about the
Hytron line, they should jump in here.

--73--

--Jeff Duntemann KG7JF

Scottsdale, Arizona

Date: Wed, 20 Nov 1996 11:32:08 -0500

From: lee@radioadv.com (Lee Richey)

To: <jeffd@coriolis.com>,

Subject: Re: 6BM8 wiring and schematic

Message-ID: <19961120165209700.AAB110@lee.radioadv.com>

Jeff wrote

> The one big gap in Web data formats is lack of a standard vector format
for
> technical line drawings. It's absurd to use something as big as a GIF or
> TIF to specify a few hundred vectors.

This is a good point. The CAD program I use uses vector graphics and
generates rather compact files. For instance, the 6BM8 schematic is
less than 30K.

The problem as Jeff pointed out is that no conventional viewers exist for
the data files.

With that in mind, I spoke to the company today about making a low cost
or free version of the program available to expedite transfer of schematics
and other line drawings. They indicated considerable interest in doing
that

by stripping the present CAD package of Gerber features and other things
that are not necessary to produce and read schematics and drawings. If
this comes to pass, we will have a low or no cost way of transferring
drawings and if someone eventually wants to generate pc board layouts,
the schematic drawings can be imported into a full featured version of the
program where it will generate a net list, etc.

Could be a good marketing move for the company. I hope to hear something
in a few days and will keep you posted.

-Lee- -WA3FIY-

<http://www.radioadv.com>

End of GLOWBUGS Digest 358
